

5. The IC package of claim 1, wherein the heat sink is coupled to one of a signal voltage and a reference voltage so the heat sink operates respectively as a signal plane and a ground plane for the leads of the lead frame.

Sub A2
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Sub B4

6. The IC package of claim 5, wherein the heat sink is coupled to the reference voltage through one of a wirebond, a conductive adhesive, and a welded connection.

Sub A2
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7. The IC package of claim 1, wherein the heat sink is electrically isolated from the lead frame.

8. The IC package of claim 1, wherein the heat sink is positioned only partially within the package body.

Sub C2
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9. The IC package of claim 1, wherein the heat sink is coupled to a printed circuit board outside the package body and is thereby coupled to one of a signal voltage and a reference voltage so the heat sink operates respectively as a signal plane and a ground plane for the leads of the lead frame.

Sub A3
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10. The IC package of claim 8, wherein the second portion of the heat sink projects substantially to one of a top and a bottom of the package body.

Sub C2

11. The IC package of claim 1, wherein the heat sink is positioned within the package body with the surface of its first portion in close proximity to substantially all of the enclosed portion of each of the leads of the lead frame.

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12. The IC package of claim 1, wherein the heat sink is positioned within the package body with its first portion extending substantially to at least one side of the package body.

Sub A4
Sub C2

a first portion having a surface constructed to face the lead frame in close proximity to a substantial part of the enclosed portion of each of the leads of the lead frame, a die-attach area on the surface of the first portion being attachable to the IC die; and

5 a second portion substantially opposite the die-attach area for projecting away from the first portion under the die-attach area and the IC die.

22. An electronic system comprising an input device, an output device, a memory device, and a processor device coupled to the input, output, and memory devices, at least one of the input, output, memory, and processor devices including an integrated circuit (IC) package comprising:

10 a package body;

an IC die positioned within the package body;

15 a lead frame including a plurality of leads having portions enclosed within the package body that connect to the IC die; and

an electrically conductive heat sink positioned at least partially within the package body with a surface of a first portion of the heat sink facing the lead frame in close proximity to a substantial part of the enclosed portion of each of the leads of the lead frame and having a die-attach area on the surface of the first portion attached to the IC die, a second portion of the heat sink being opposite the die-attach area and projecting away from the first portion and the IC die.

23. A lead frame assembly comprising:

a lead frame; and

25 a heat sink positioned with a surface in a substantially mutually parallel and co-extensive relationship with, and in close but electrically insulated proximity to, the lead frame.

27. The IC package of claim 26, wherein the package body is selected from a group comprising a transfer molded plastic package body and a preformed ceramic package body.

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Sub B9
28. The IC package of claim 25, wherein the IC die is selected from a group comprising a Dynamic Random Access Memory (DRAM) IC die, a Static Random Access Memory (SRAM) IC die, a Synchronous DRAM (SDRAM) IC die, a Sequential Graphics Random Access Memory (SGRAM) IC die, a flash Electrically Erasable Programmable Read-Only Memory (EEPROM) IC die, and a processor IC die.

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29. The IC package of claim 25, wherein the lead frame is selected from a group comprising a peripheral-lead finger lead frame, a Leads Over Chip (LOC) lead frame, and a Leads Under Chip (LUC) lead frame.

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30. The IC package of claim 25, wherein the heat sink is coupled to one of a signal voltage and a reference voltage so the heat sink operates respectively as a signal plane and a ground plane for the leads of the lead frame.

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Sub B10
31. The IC package of claim 30, wherein the heat sink is coupled to the reference voltage through one of a wirebond, a conductive adhesive, and a welded connection.

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Sub C3
32. The IC package of claim 25, wherein the heat sink is electrically isolated from the lead frame.

33. The IC package of claim 26, wherein the heat sink is positioned only partially within the package body.

34. The IC package of claim 26, wherein the heat sink is coupled to a printed circuit board outside the package body and is thereby coupled to one of a signal voltage and a reference voltage so the heat sink operates respectively as a signal plane and a ground plane for the leads of the lead frame.

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A006

SUB
C3

35. The IC package of claim 34, wherein the second portion of the heat sink projects substantially to one of a top and a bottom of the package body.

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36. The IC package of claim 26, wherein the heat sink is positioned within the package body with the surface of its first portion in close proximity to substantially all of the enclosed portion of each of the leads of the lead frame.

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A006
SUB
C3

37. The IC package of claim 26, wherein the heat sink is positioned within the package body with its first portion extending substantially to at least one side of the package body.

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38. The IC package of claim 26, wherein the heat sink is positioned within the package body with the surface of its first portion in close proximity to at least eighty percent of an area of the lead frame.

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39. The IC package of claim 25, wherein the first and second portions of the heat sink are integral with one another.

40. The IC package of claim 25, wherein the first and second portions of the heat sink comprise separate parts.

41. The IC package of claim 25, wherein the heat sink comprises a plurality of parts, each forming a portion of both the first and second portions of the heat sink.

